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THE UNIVERSITY LIBRARY AND INFORMATION CENTER: A NEW DIMENSION

Because there has been particular interest in a report on the documentary work done in the Centre de Documentation at Laval University, and especially in its use of the Miracode machine, I will give a general account of our experience at Laval in setting up this documentation center which operates under the auspices of the University Library.

The documentation center is designed to assist both teachers and those engaged in research. Its function is not, as some may imagine, primarily to collate documents not in the possession of the library, but rather to extract from books, periodicals, and other documents information which may be needed for purposes of teaching and research by the various faculties and institutes of the University. Before discussing the work of the center perhaps some background observations would be in order.

In France, when a professional librarian attains a rank equivalent to that of a "senior librarian" in America, he is given the title of "conservateur" (i.e., conserver). I believe, whether we like to admit it or not, it is indisputable that a major, if not principal, function of the professional librarian has long been and still is the conservation of books. The first criterion of the quality of a library, for example, is still the over-all quantity of volumes it contains. Even in our day, this criterion takes precedence over most others. I know one university library that refused for three years to give up a collection of one hundred thousand law books which logically belonged in the library of the faculty of law, because by surrendering them, the general library would have fallen below its boasted one million volumes.

Also, as a member of a study group on scientific and technical information in Canada, I have recently participated in public meetings held at a

number of Canadian universities, and conducted numerous interviews with faculty members, researchers, graduate students, librarians and directors of data processing centers. Since the official report of the group is not yet published, I am at this time in no position to offer any predictions concerning its findings and recommendations. But on the whole, the experience of the group appears to bear out Bonn's observation, as noted by Robert B. Downs in his report on the *Resources of Canadian Academic and Research Libraries,* that there is "a frequent breakdown of communication between the faculty and the librarians."[1]

My own experience tends to confirm this conclusion. There is too often, in Canada as elsewhere, an almost complete lack of dialogue between faculty members and librarians and, in many cases, between librarians and data processing people. The situation may be attributed, in part at least, to two principal factors.

First, on comparing the rate at which library science is evolving with the rate of development of the pure and applied sciences, we become aware of an enormous discrepancy. While the former is changing relatively slowly, the latter is developing with lightning rapidity. Evidently, a major adjustment is needed to coordinate the rhythm of development of library science with the faster tempo of scientific progress and to make a dialogue between scientists and librarians possible.

The second factor, and probably the more important of the two, is that librarians simply cannot cope with the explosion of scientific literature. The latest statistics I could find on the subject are already a year old and therefore probably obsolete. They appear in an article by Muriel Lederer in *Focus;* and state, "We are now publishing nearly 1,000 new books every day, in addition to 33,000 newspapers and 70,000 periodicals. In the rapidly changing medical field alone, some 200,000 journal articles and 10,000 newspapers are published each year. In chemistry, 10 million words are added every month."[2]

In order to gain some further appreciation of the extent of this problem, I made a survey early in 1966 of articles published during the preceding year on the subject of the amino acids. The total number of these articles came to the staggering figure of 36,000. One can easily imagine the predicament of a chemist or a biochemist faced with this avalanche of technical information. To quote Muriel Lederer once again: "Scientists and engineers are haunted by the fear that they are working on problems where solutions have already been found and published."[3]

Or, to cite a specific case: "An article on the successful application of Boolean algebra to electrical circuits appeared in a journal of the Soviet Academy of Science in 1950, and though an English abstract later was published, it was not discovered until five years afterwards—after several teams of mathematicians in a variety of American industrial concerns had spent more than fifteen man-years in unsuccessful attempts to solve the problem.[4]

Further, a metallurgist, Dr. C. E. Beaulieu, working under the auspices of a program that the Laval Documentation Center operates in collaboration with Automatic Subject Citation Alert, has found in a paper by an unknown Russian scientist the result of an experiment that he and a colleague had intended to make and which would have taken months to realize.

As Lederer reports,

> A dynamic solution to the problem is described in *The Library and Information Networks of the Future,* a report prepared by the American Library Association for the usage of the Rome Air Development Center, Air Force Systems Command, USAF (Griffiss Air Force Base, in Rome, New York).
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> In this revolutionary plan for the American reader of the 1970's your home would be tied in with local libraries which would, in turn, be connected to one of six regional library centers across the country. These regional centers would be connected to a national center. All information stored in any of these libraries would be available to you in your home or office with equipment no more complicated than your dial telephone.[5]

All this, as far as I am concerned, however, is still very much in the realm of fantasy. Not that I question the technical feasibility of such a system—but I am convinced that access to information will always, in the final resort, depend on human resources. A librarian, documentalist, or scientific information officer (by whatever title he is to be designated) will always be needed to mediate between the system and the user.

My purpose so far has been to suggest, accordingly, that the university library of the future—no matter how abundantly equipped with books and how efficiently organized with regard to its technical services, its catalog, its periodical index, its national and international documents file will have to offer services far beyond those traditionally expected of it in the past. It will have to add a new dimension to its accustomed role, and become in fact a university library and information center.

The information center ought not to be an entity distinct from the library itself, but rather an extension of it. Our own experiences in this regard at Laval University over the last five years may serve to illustrate this concept.

In 1962, Laval University requested Edwin Williams of Harvard University and R. P. Filion, librarian at Laurentian University, to prepare a report on the state of its library. One of the recommendations of the report was that "the general library of the University take initiative to organize and to operate on its premises, separate from but in proximity to its central information services (bibliography, subject index, card catalogues, etc.) a Documentation Centre on Quebec and French Canada. The responsibility for the organization of this Centre should be entrusted to a person well-versed in the methodology of research in the humanities, the technical organization of an up-to-date university library, methods of documentary analysis and of classification, and finally techniques of storing and of utilizing information efficiently."[6]

On May 15, 1963, Laval University placed me in charge of this project. Although I did not possess all the necessary qualifications, I must also admit that I respected neither the spirit nor the letter of the recommendation. In fact, several months of reflection and study led me to the following conclusions:

1) That the Documentation Center ought to be interdisciplinary in scope, serving both the humanities and the pure and applied sciences.

2) That it should not restrict itself to French Canada, but cover instead all the needs of research and teaching.

3) That it ought to be allowed to develop along pragmatic lines. For obvious reasons, it was inconceivable to envisage a program of documentation which could at the outset embrace all fields of research and teaching. In developing documentation in any given area, we felt obliged to work in cooperation with the chairman of the department concerned or with a director of research able to set limits to the work of retrospective documentation and to suggest ways of presenting the information collected.

4) It became obvious, moreover, that the efficient functioning of such an information center would require some degree of automation. Thus, almost in spite of myself, I found myself channeled in the direction of the new discipline of computer science. Since I happened to be the first librarian at Laval to take interest in such an approach, I was soon given the additional task of supervising the automation of library services. (Being the only person involved in this type of work had its compensations, however, for it is surprising how quickly one acquires the reputation of being an expert in a field in which one works alone!)

In conducting our experiment, we were thus confronted with two kinds of problems:

1) On the psychological level, the idea of an information center had to be made acceptable to the potential user.

2) On the technical level, the problem of data processing had to be resolved.

Common to each of these was a third problem of personnel. An effective documentation center obviously requires the services of expert documentalists—a profession which was virtually non-existent, as such, in the province of Quebec at the time of our experiment. Advertisements placed in various newspapers and specialized journals for the purpose of recruiting such personnel yielded no results. After some consultation, we therefore decided to employ a number of third-year students on a part-time basis, to work in the Center at the rate of ten to fifteen hours per week during the academic year and full time during the summer vacation. This solution produced effective results, so that within a few months we had managed to recruit some of our best students, with the help of the various faculties concerned.

Taking the publications of Laval University as our point of departure, we then proceeded to compile an analytical index of periodicals in philosophy, theology, geography, industrial relations and history. Needless to say, the student-researchers themselves derived considerable benefit from this work, since each of them was in fact occupied with research in his own field of specialization.

On the other hand, building up satisfactory relations with department heads and directors of research proved infinitely more perplexing. I remember appealing initially to various directors of research to entrust to the Center part of their documentary work, and being turned away, ever so politely, by them. The first opening presented itself, however, when the Science Library Committee asked us to prepare an analytical index of all doctoral dissertations in science defended in French universities during the last five years, as a French counterpart of *Dissertation Abstracts.* Our second venture, undertaken in conjunction with the Institute of Geography, was a pilot project to analyze geographical maps. This was followed by the task of organizing, analyzing and indexing documentation in the field of industrial relations. Subsequently, similar projects were undertaken for the Department of Bio-Medicine and in the field of political science and thereafter in so wide a variety of academic disciplines, in fact, that our Documentation Center is now obliged to refuse a number of interesting projects owing to a lack of money and of staff. Nevertheless a great number of professors and students were unaware that the Center even existed.

During the whole of this transitional period, we worked under the auspices of the Library. By the summer of 1967 some of those in authority began to realize the sort of expansion the Documentation Center seemed to be working toward, and the Study Commission of the University was requested to define the Center's status and decide what policy should govern its development. On the basis of a special committee report, the Commission made the following recommendations:

1) That the Documentation Center should have its own Council responsible to the Library Council, and presided over by the director of the Center. The members of the Council would include the head librarian and five professors appointed by the University Council (two from the science faculties, two from the Faculty of Letters, and one representative from the Information Processing Center).

2) That the University faculties should make quite clear the specific fields of research in which they are interested.

3) That a documentation committee be formed within each faculty.

4) That each documentation committee be kept informed of current projects organized by the Documentation Center, and of the fields of research in which each faculty is engaged.

5) That a special catalog should be prepared for the library to facilitate access to the documentation prepared at the Center; and that the Center itself be empowered, academically and administratively, to carry out its own research programs and to obtain grants to this end. In this way the Documentation Center would obtain official recognition both in the academic and administrative fields.*

*This resolution was adopted by the Laval University Council July 26, 1967.

In the committee report it is clearly stated that the orientation of which I have just spoken should be carried even further: "the Documentation Center must not of course neglect the building up of full documentation on French Canada. At the same time it must serve the needs of the various departments and research centers that call upon it." This kind of service has become a necessary complement to that of the library.

As far as financing of projects is concerned, it was also decided that faculties and departments should finance their own research in documentation during the first year of a project. If it is then decided that the project is of permanent interdepartmental interest, the Center's Council can recommend that further financing come out of the Center's own budget. Academic responsibility for research projects in documentation remains in the hands of the respective faculties and is handled by the documentation committees. The Center assumes responsibility for the administrative and technical side.

Laval University's Documentation Center is thus, I believe, unique of its kind. I hope that this description of the way it functions will help those who may wish to set up a similar center to benefit from our own experience in this regard.

Technically speaking, our first major problem was to find some system of analysis—that is, of classification and of indexing which would make it possible to locate easily and rapidly the documentation required in a particular section of research or teaching. Three principal factors had to be taken into consideration: First, the amount of basic documentation which could be determined upon and the need to keep this documentation constantly up to date, despite not knowing exactly how much material would be involved; second, the interdepartmental interest a particular piece of documentation might hold, which would allow one to make the most efficient use of it; and finally, new lines of research that might stem from a given piece of research or a teaching program.

We started off by using the KWIC indexing approach, but found almost immediately that this indexing system just does not work in French. French differs from English in that it lacks the concision of the latter. In English, an adjective placed before a noun evokes a concept in its quasi-totality, whereas in French, a definite or indefinite article, or a preposition is often linked to the determinant. Texts broken down by the KWIC scheme were thus so mutilated as to be unintelligible. We therefore abandoned this system and turned to the KWOC. Here again we ran up against a basic problem, the rejection of unnecessary words which would allow indexing of key-words. An enormous waste of machine time was incurred, and we abandoned this system, too, as quite impractical.

We finally decided to construct our own program, ASYVOL, which translated from French means "Synthetic Analysis by Free Vocabulary." By synthetic analysis we mean the transmission in the briefest possible way of what a writer has to say. It also means that the documentalist is not restricted by a thesaurus or a subject heading list. The documentalist is instructed to use the author's own terminology as much as possible. This avoids over-standardization of terminology and allows our vocabulary to evolve with the discipline it deals with. This approach to documentation was heavily criticized

at the beginning, but was developed to meet the needs of research workers who were familiar with the new terminology of their subjects, and who expected to find documents under these new headings.

Given below is an example of a documentalist's work-sheet.

ANALYTICAL INDEX

Class-mark		P433-220867-0694
Authors	101	PECHER ALPHONSE
	102	POINCARE, H SCIENCE AND HYPOTHESIS
Title	104	THE AXIOMATICAL
and	105	PEDAGOGI V. 22, NO. 8, Oct., 1967
Source	106 to 110	
Analysis	201	DIALOGUE BETWEEN A FATHER AND THE AUTHOR CON-
	202	CERNING THE THEORY OF UNITIES, STUDIED BY HENRI
	203	POINCARE IN HIS WORK "SCIENCE AND HYPOTHESIS"
	204 to 230	
Methodo-	301	SCIENCE - MATHEMATICS - STUDY AND TEACHING
logical	302	EDUCATION - TEACHING
Index	303 to 310	
Analytical	401	MODERN MATHEMATICS
Index	402	THEORY OF UNITIES
	403	POINCARE, HENRI
	404 to 420	

The key for the descriptive elements thus reads:

101 The author
102 The author and title of book reviewed
104 Title of the article
105 Source of information
201-203 Synthetic analysis
301 and 302 Systematic Index
401-403 Key words in free vocabulary.

From such inputs, the computer program will produce the following outputs:

1) Analytical Index—The three key words will be separately indexed and the analysis repeated under each one;

2) Systematic Index—Science-Mathematics-Study and Teaching;

3) Author Index;

4) Author reviewed—Name of the author and title of the work reviewed; and

5) Reference index—Under the title of the periodical indexed, a complete reference is listed in the first four lines.

We have published a number of such indexes using ASYVOL*. This system has proved extremely helpful in the compilation of indexes and is used

*A list of those available can be obtained from the author.

in the library as well. However, in specialized research the system does not allow the synthetic collation of the subjects dealt with, and we were looking for a formula which would fill this need when the existence of the Miracode machine (Microfilm Retrieval Access Code) was brought to our attention.

A visit to the head office of the Recordak Company increased our interest, but also left us in a quandary, with a number of questions unanswered. I therefore asked the company to lend one of their machines for a short period. I persuaded one of our geographers to collaborate in an experiment involving the use of maps. We then mobilized the entire staff of the Geography Institute, and in less than three weeks had analyzed almost 2,000 maps of Quebec, using color microfilm at the request of the Institute. A demonstration, to which we invited professors and research workers proved conclusive for us, and a few months later we bought the machine.

The use of Miracode has not changed our philosophy of approach, and we are still using free vocabulary. But instead of providing a systematic index, we now structure our documentation. For example, the Center of Bio-Medicine asked us for a document observation made after a specific innoculation of a cancerous mouse. They were particularly interested in the development of fever that follows such an innoculation. It was an easy matter to break down mouse cancer and fever and find the appropriate code for innoculation. We found the document within a few seconds. But the researcher might not have asked specifically for a mouse; a rat or some other rodent might have answered his purpose just as well. In that case, and had he merely asked for a rodent when in fact the information was stored under mouse, we would have been in possession of the information, but with no way of retrieving it unless we had not previously structured our information. In bio-medicine for example, we have built such structuring for a range of 500,000 animals going from the generic to the specific.

A series of tabulators is used to retrieve information of this kind. Each tabulator offers a range of 1,000 descriptors or key-words. By linking two tabulators together, this range is increased to one million. Referring to Figure 1, for example, if I press button one in the first column—this stands for mammals—and then the equality sign on the next five buttons (which stands for "don't care"), all the mammals we have will be fed into the information storage. But if I push button number three in the second column, I will obtain rodents only; button number five will restrict it to mice only, and if we use the fourth column, it could be one specific family of mice.

In building our structure in bio-medicine, we follow the pattern used by the Center whereby we proceed from:

1) a matter-object;
2) components of this matter-object (anatomy);
3) normal or abnormal condition (diseases);
4) experiments made by agent or treatment; and
5) results or observations obtained.

This same structure is applied to research in documentation. All key-words are individually codified, and we may retrieve any document or group

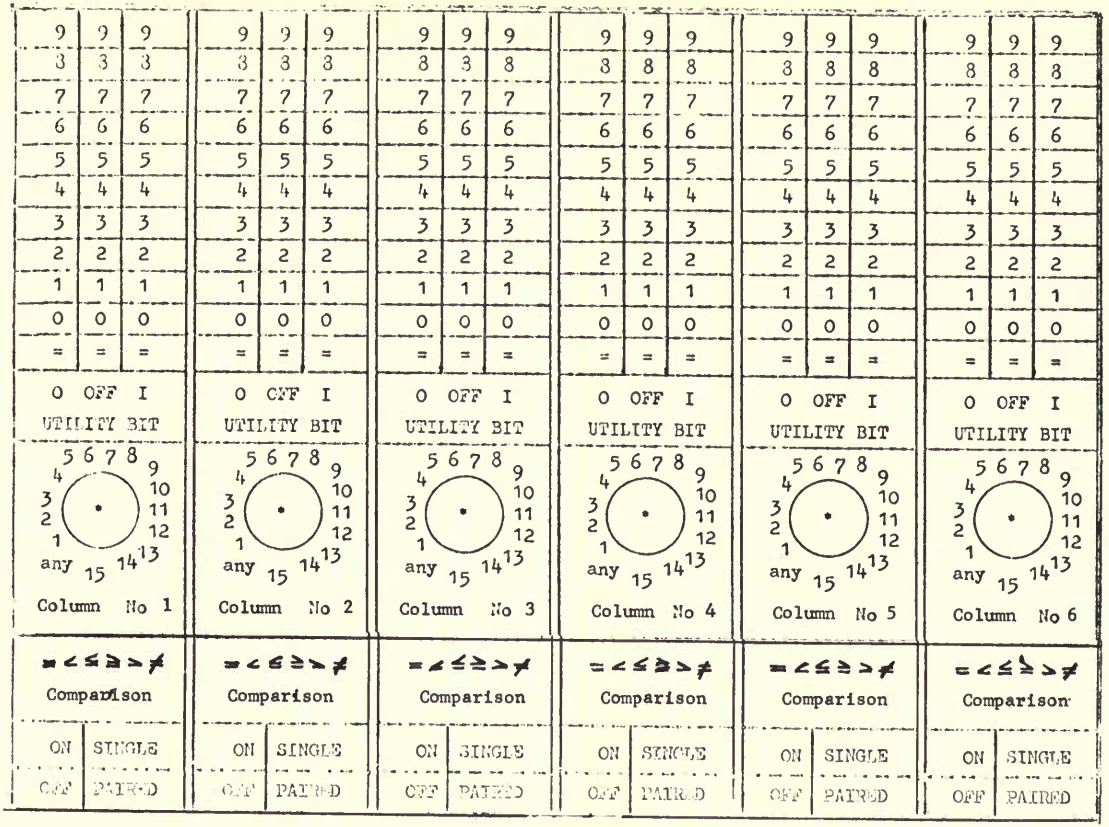

Figure 1. MIRACODE Automated Retrieval Keyboard

of documents relevant to the question. We are also planning to install a camera in front of the screen and project the image of the microfilm on a monitor to any laboratory that may request it.

At present we are working on four separate projects in documentation: (a) industrial relations (regarding collective agreements in force in Quebec), (b) Canadian jurisprudence (insurance cases), (c) bio-medicine (documents which have been selected by the biologists and physicians in this Center), and (d) philosophy (any documents dealing with Aristotle). The aim of our Center is to turn every faculty member into a cooperating documentalist. Each faculty member may decide for himself whether material is valuable. If it is likely to be requested for future retrieval, he will send it to the Documentation Center, with underlining of those concepts which will identify it for his own retrieval purposes. Our own staff documentalists may then add some descriptors to enlarge the utility of the document for other research workers. The document will then be coded, microfilmed, and made accessible to all those on the campus.

The main goal of our Documentation Center is thus to establish a constant dialogue with faculty members, and to create a new dimension to our University Library. We feel that we have begun to make significant progress toward that goal.

References

1. Downs, Robert B. *Resources of Canadian Academic and Research Libraries.* Ottawa, Association of Universities and Colleges of Canada, 1967, p. 18.

2. Ledere, Muriel. "Streamlining Our Libraries." *Bausch & Lomb Focus,* vol. 38, no. 1, p. 18, Spring 1967.

3. *Ibid.,* p. 19.

4. The Knowledge Availability System Center, University of Pittsburgh, [1965], p. 1. (Pamphlet.)

5. Lederer, *op. cit.,* p. 19.

6. Williams, Edwin E., and Filion, Paul-Emile. *Rapport d'une Euquête sur la Bibliothéque de l'Université Laval.* Quebec, 1962, pp. 54-55.